



KERALA AGRICULTURAL UNIVERSITY  
B.Tech.(Ag. Engg.) 2017 Admission  
III Semester Final Examination-January-2019

Sacs.2110

Engineering Mathematics-III (2+1)

Marks: 50  
Time: 2 hours

I Fill in the Blanks

(10x1=10)

- 1 The probability density function of normal distribution is \_\_\_\_\_
- 2 Two regression line intersect each other at the point of \_\_\_\_\_
- 3 The concept of regression was given by \_\_\_\_\_.
- 4 Nonsense correlation is \_\_\_\_\_
- 5 Number of roots of  $\frac{x}{2} = \cos(x)$  are \_\_\_\_\_.

State True or False

- 6 Range is a measure of dispersion. (True/ False)

Choose the correct answer.

- 7 If a polynomial of degree  $n$  has  $n + 1$  roots. Then the polynomial is  
a. Identically zero    b. Partially zero    c. Both (a) & (b)    d. None of the above.
- 8 The averaging operator  $\mu =$   
a.  $\frac{1}{2}(E^{\frac{1}{2}} + E^{-\frac{1}{2}})$     b.  $\frac{1}{2}(E^{\frac{1}{2}} - E^{-\frac{1}{2}})$     c.  $(E^{\frac{1}{2}} + E^{-\frac{1}{2}})$     d.  $(E^{\frac{1}{2}} - E^{-\frac{1}{2}})$
- 9 Stirling's interpolation formula is applied for  
a.  $|p| < 0.5$     b.  $|p| \leq 0.5$     c.  $|p| > 0.5$     d.  $|p| \geq 0.5$
- 10 If Laplace transform of the function  $f(t)$ ,  $L[f(t)] = F(s)$ , then  $L[e^{at} f(t)] =$   
a.  $F(s/a)$     b.  $F(s+a)$     c.  $F(s-a)$     d.  $F(sa)$

II Write Short notes on any FIVE of the following

(5x2=10)

- 1 An experiment was conducted under uniform conditions i.e. in lab to compare 3 varieties A, B and C and following observations are recorded related to yield

Varieties	(Yield in Kg)				
A	25	30	40	35	
B	10	8	19		
C	6	4	7	3	10

- Test the hypothesis that there is no significant difference between the average yields of these varieties at 5% level of significance.
- 2 A random sample of 40 students is selected from a class and it was found that 8 are from Delhi, 12 from Hyderabad, 5 from Nainital and 15 from Bijapur. Test the hypothesis that students in these groups are in the ratio 1:1:1:1 i.e. 25% in each group. (Given  $\alpha = 0.05$ )

P.T.O

- 3 Write four properties of Regression coefficient.
- 4 Find Laplace transform of  $\text{Cosh}(at)$ .
- 5 Show that  $\mu^2 = 1 + \frac{1}{4}\delta^2$ , where  $\mu$  and  $\delta$  are the average and central difference operator.
- 6 Evaluate  $\int_1^2 \log(x) dx$  by trapezoidal rule with step length 0.2.
- 7 Solve the following differential equation using Picard's method,  
 $\frac{dy}{dx} = y + x$  and  $y = 1$  when  $x = 0$  Approximate  $y$  when  $x = 0.1$  and  $x = 0.2$  from first approximation up to three decimal places.

**III Answer any FIVE of the following.**

**(5x4=20)**

- 1 Calculate correlation coefficient for regression lines

$$4y - 9x - 15 = 0$$

$$x - 4y + 23 = 0 \quad \text{Also, Calculate } V(y) \text{ if } V(x) = 9.$$

- 2 Write short note on Two-sample Z-test. Also test whether the following random sample have come from two independent normal populations having equal means. ( $\sigma_x = 4, \sigma_y = 5$ ), consider level of significance at 5%.

Sample (X)	15	20	15	17	25	20	18	22
Sample (Y)	10	12	9	13	15	16	11	14

- 3 If 100 flips of a coin result in 30 heads and 70 tails, can we assert on the 5% level that the coin is fair?
- 4 Solve the following Ordinary differential equation with help of Laplace transform  
 $y'' - y' = t, y(0) = 1$  and  $y'(0) = 1$
- 5 Given  $\frac{dy}{dx} = \frac{y-x}{y+x}, y(0) = 1$ . Find  $y(0.2)$  using Runge-Kutta method of fourth order with step length 0.2.
- 6 Apply Newton's divided difference formula to find value of  $y(8)$  and  $y(15)$  from following table:

x	4	5	7	10	11	13
y	48	100	294	900	1210	2028

7 Find the missing term in the following table

x	10	15	20	25	30	35	40
y	270	---	222	200	---	164	148

IV Answer any ONE of the following (1x10=10)

1 i. Test whether the attributes A and B are associated, given the following contingency table.

	B1	B2	B3	B4	B5
A1	12	37	16	26	22
A2	21	25	13	17	31
A3	31	19	20	15	15
A4	26	31	33	10	20

2 a). Estimate y at  $x=12.2$  with the help of Stirling formula for the data given

x	10	11	12	13	14
y	0.23967	0.28060	0.31788	0.35209	0.38368

Also find derivative of y at  $x = 12.2$ .

b). Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  by using i) Simpson's 1/3 rule and ii) Simpson's 3/8 rule.

Compare the error in both the cases with actual value of given definite integral.

Take  $h = 1$ .

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Table Value	$t_{14}$	$F_{(2,9)}$	$x_3^2$	$x_{12}^2$
At 5%	2.145	4.46	7.815	21.026